

# Summary and Discussion of CROGEE Water Storage Report



**“ When the rains came this winter,  
the Everglades flooded.**

**Now, when we need rain, that  
extra water is gone.”**

**- Palm Beach Post  
June 25, 1998**

# Background

- CROGEE in existence from 1999-2005
- Seven reports completed
- Last report on “Re-engineering Water Storage in the in the Everglades” completed in 2005
- Report presents 7 key findings and recommendations
  - Findings and recommendations primarily concern land acquisition, sequencing, development of system performance measure to evaluate tradeoffs, and providing ecologic benefits more quickly
  - One recommendation and finding concerning consideration of additional water storage options

# Major Findings and Recommendations

- Priority should be to acquire land now
- Focus on intermediate restoration points in addition to endpoint to prevent additional system damage in short term
- Develop methodology to allow trade-offs to be assessed over the entire ecosystem
- Options should be considered for using EAA and Lake Okeechobee in ways not now part of plan
- Sequence projects to provide benefits to the natural system sooner
- Coordinate CERP with efforts outside of CERP
- Create regional information synthesis center to assist adaptive management effort

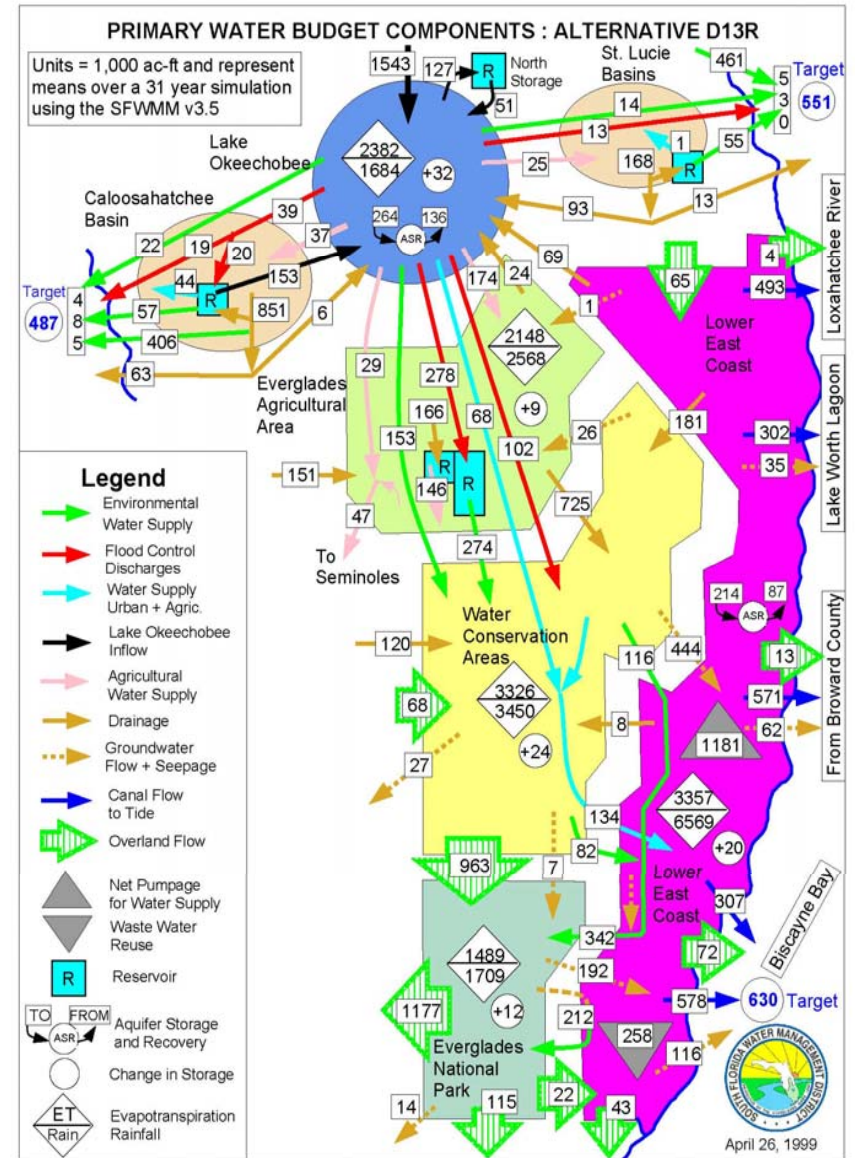
# Why Do the CROGEE Recommendations Address More than Storage Options?

“Storage is a critical aspect of the functioning of the Everglades ecosystem and of the Restoration Plan, but other critical factors, such as timing of land acquisition, intermediate states of restoration, and evaluating tradeoffs among competing goals or ecosystem components, provide the context for choosing and implementing storage options.”

- CROGEE Report, page 13



# CROGEE storage analysis based on 1999 CERP water budget



# CROGEE Storage Analysis

Component	Capacity (acre-feet)
Lake Okeechobee	2,250,000
WCAs	1,882,000
Surface Reservoirs	960,000
STAs	160,000
<i>Total Conventional Storage</i>	1,120,000
In-Ground Reservoirs	330,000
ASR	1,850,000 / year
Wastewater Reuse	250,000 / year

# CROGEE Views on EAA Role

- Soil oxidation continues to consume peat in EAA
- Economic factors may affect near-term fate of agriculture production in EAA
- Development pressures could result in conversion of agricultural lands and could cause problems for Everglades restoration
- CROGEE recommended re-evaluation of EAA's future role in Everglades restoration
  - Acknowledged this is complex analysis requiring estimates of costs of land acquisition, feasibility and likely costs of various options, and other matters



# CROGEE Views on EAA Role

## (continued)

- Portions of EAA no longer used for agricultural production could be flooded and allowed to revert to natural wetland condition
  - Many centuries to accrete the amount of peat soil present before drainage
  - System would tend to act as giant STA

# CROGEE Views on EAA Role

## (continued)

“However, subsidence due to peat loss in the agricultural area south of Lake Okeechobee has caused the land surface to be lower than in areas to the south. This means that even if the Herbert Hoover dike were breached, slow sheet flow to the south would not be restored in the area that was historically a sawgrass plain. Instead, the subsided area would become an extension of the lake itself. An expanded lake of this type would provide significant storage and damping of southward flows, but it would also inundate established communities and agricultural lands surrounding the current perimeter of the lake and increase the flooding hazard in other areas to the south and southeast. This type of restoration, therefore, would require additional engineering measures for flood control.”

# CROGEE Views on Lake Okeechobee Storage

- The lake has capacity to provide much more storage than it does under its current operating rules [13.5-18.5 feet]
  - Increasing the maximum stage by 0.5 feet would provide 82% of total storage provided by in-ground reservoirs
- Higher lake levels coupled with effective nutrient controls would not cause poor water quality associated with higher water levels
- Higher water levels, while diminishing littoral zone in northwestern area, may enhance littoral zone in southwest part of lake
- Given uncertainties with other storage options, CROGEE believes it prudent to revisit question of using Lake Okeechobee to provide additional storage

# CROGEE Analysis of Lake Okeechobee Storage

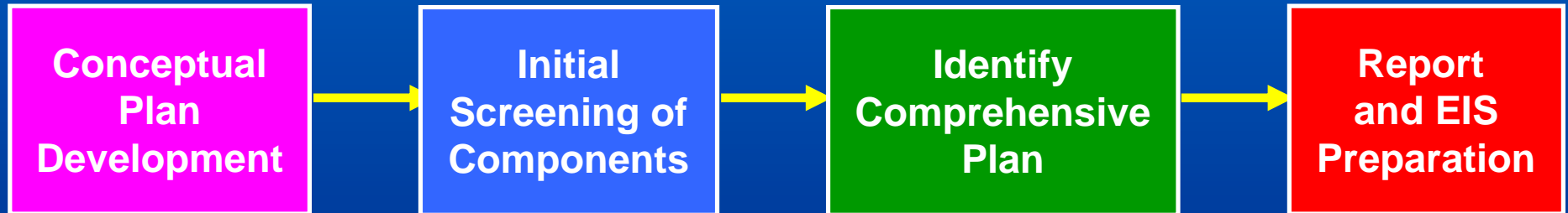
Increase in Allowable Maximum Stage (feet)	New Maximum Stage (feet) [NGVD]	Additional Storage (acre-feet)
0.5	19.0	227,500
1.0	19.5	462,500
1.5	20.0	697,500

# CROGEE Views on Lake Okeechobee Storage

“It simply may not be possible to protect all of the existing interests and conditions or to proceed with the project while preserving certain hydrologic and social features of the landscape in south Florida that were initially thought to be worth preserving...The intent of existing plans is to continue to manage Lake Okeechobee in accordance with the prevailing hydrologic performance indices that govern the lake level and thereby tend to protect the existing littoral zone. This will severely constrain the extent to which Lake Okeechobee might be used for storage. With time and change, it could turn out that the only way to complete the project as envisioned would be to use Lake Okeechobee for additional storage and possibly sacrifice, to some extent, the continued preservation of the current littoral zone.”

- CROGEE Report, page 83

# Comprehensive Plan Development Process





# Restudy Screening Results

- 58 different management measures with a total of 174 scales were analyzed through cost-effectiveness analysis
- Measures grouped into 7 functional categories for analysis
- Function B – Improve Management of Lake Okeechobee Water Levels considered:
  - Storage reservoirs in the Kissimmee Basin
  - Raise Lake Okeechobee regulation schedule
  - Lake Okeechobee Regional ASR

# Restudy Screening Results (continued)

- Assumed costs for raising Lake Okeechobee regulation schedule:
  - 0.5 foot rise - \$0
  - 1.0 foot rise – \$32.3 million
  - 2.0 foot rise - \$247.9 million
- Cost-effectiveness analysis showed raising of Lake Okeechobee regulation schedules had lowest cost per acre-foot of storage

# So Why Was Raising the Regulation Schedule Not Considered Further?

- Maximal use of storage in Lake Okeechobee would cause adversely affect the littoral zone in the lake
- Restudy investigated moving levee on northwest side of the lake back to offset littoral zone losses due to higher lake stages
  - Would act more like marsh than littoral zone
- Analyses (Restudy and CROGEE) do not consider costs to upgrade Herbert Hoover Dike from levee to dam to keep water levels higher for longer periods of time

# Lake Okeechobee Regulation Schedule Study (LORSS)

- Current regulation schedule is WSE
- Study of new regulation schedule underway
  - Alternatives have been posted
- Public meetings scheduled for next week to discuss tentatively selected plan
- Public comment period on Draft SEIS and Water Control Plan August 7 – September 20
- Study to be completed this December

# LORSS Study Assumptions

- Existing condition: 2007
- Development of Operational Rules will consider years/ climate data not currently in model.
- Temporary Forward Pumps
- New schedule's anticipated period of use: 2007 to 2010
- Corps will initiate new Lake Okeechobee Regulation Schedule Study & EIS in 2007, to capture Acceler8 other CERP Band 1 projects and permanent forward pumps, scheduled for implementation in 2010

# Study Constraints

- Model Period of Record (1965 – 2000) 36 Years.
- Existing Systems Conveyance Capacity.
- Stormwater Treatment Areas (STA) Water Quality Treatment Capacity (64,000 af / avg. annual)
- Existing Regulation Schedules for WCA and Kissimmee River Chain of Lakes.
- Herbert Hoover Dike Integrity (17.25 criteria for max. discharge)



# Reservoir Optimization and ASR Contingency Study

- Two studies carried out in staggered sequence:
  - Reservoir Optimization Report
    - Begin August 2006
    - Complete April 2007
  - ASR Contingency Report
    - Begin October 2006
    - Complete July 2007

# Reservoir Optimization

## Goal

Verify that storage features in CERP are properly distributed (quantity and spatially) throughout the South Florida system

## Answer the following questions:

- Are CERP above ground storage reservoirs a cost-effective option to achieve the benefits of the Plan?
- Do we need to store more water in some areas and less in others?
- Do we need more total storage in the South Florida system?

# ASR Contingency Study

## Goal

- Evaluate potential water storage and water supply options of reduced ASR capacity in the CERP

## Study will answer the following:

- What new information has we gathered since the Restudy and how does it affect the ASR system?
- What are impacts to Everglades Restoration if the envisioned capacity is not available? Consider 0% and 50% ASR
- What options exist to replace capacity and function?

# General Schedule Logic

Calendar Year

2006

2007

2008

2009

Reservoir Opt. –  
Study 1

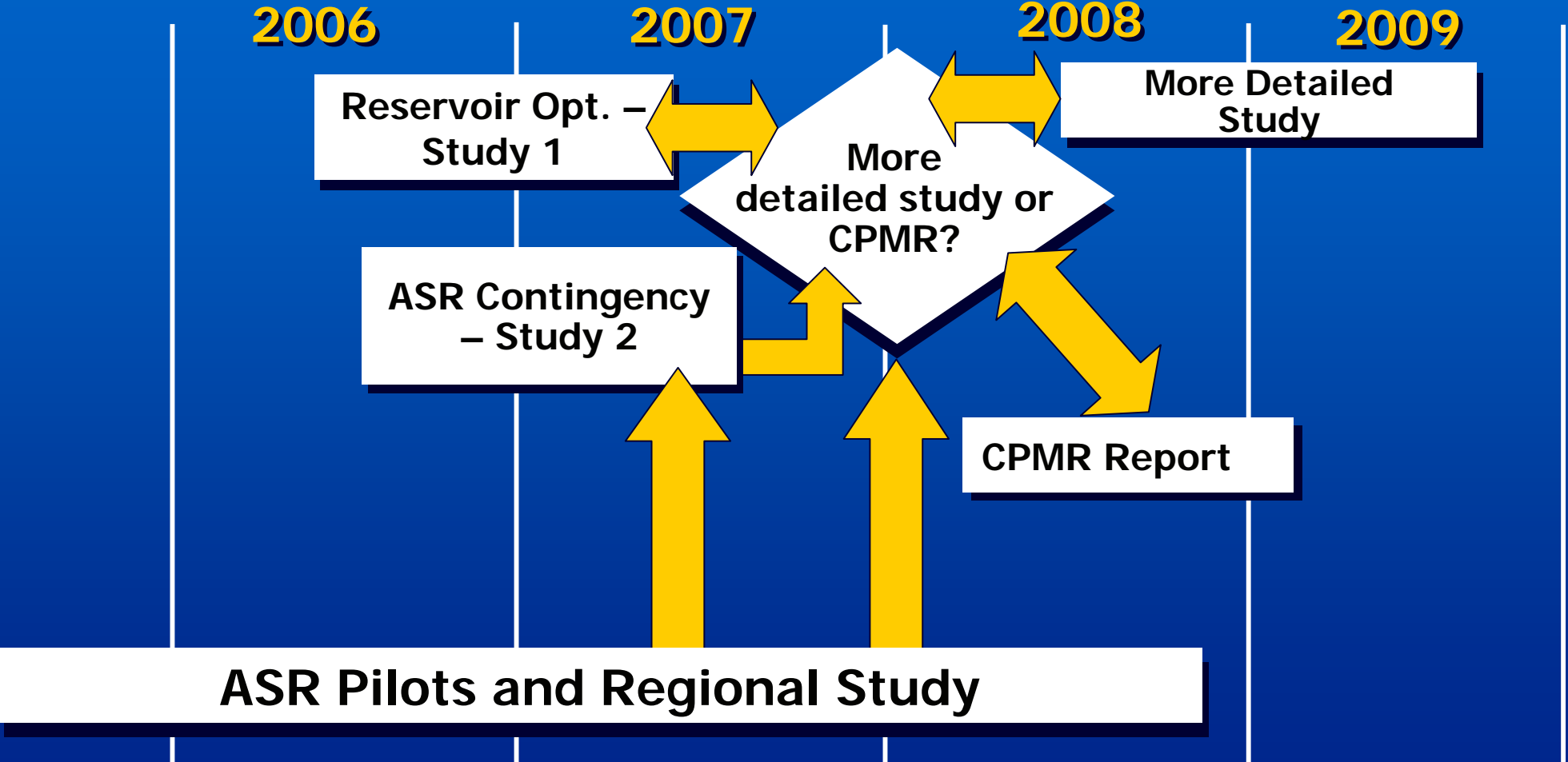
ASR Contingency  
– Study 2

More  
detailed study or  
CPMR?

More Detailed  
Study

CPMR Report

ASR Pilots and Regional Study

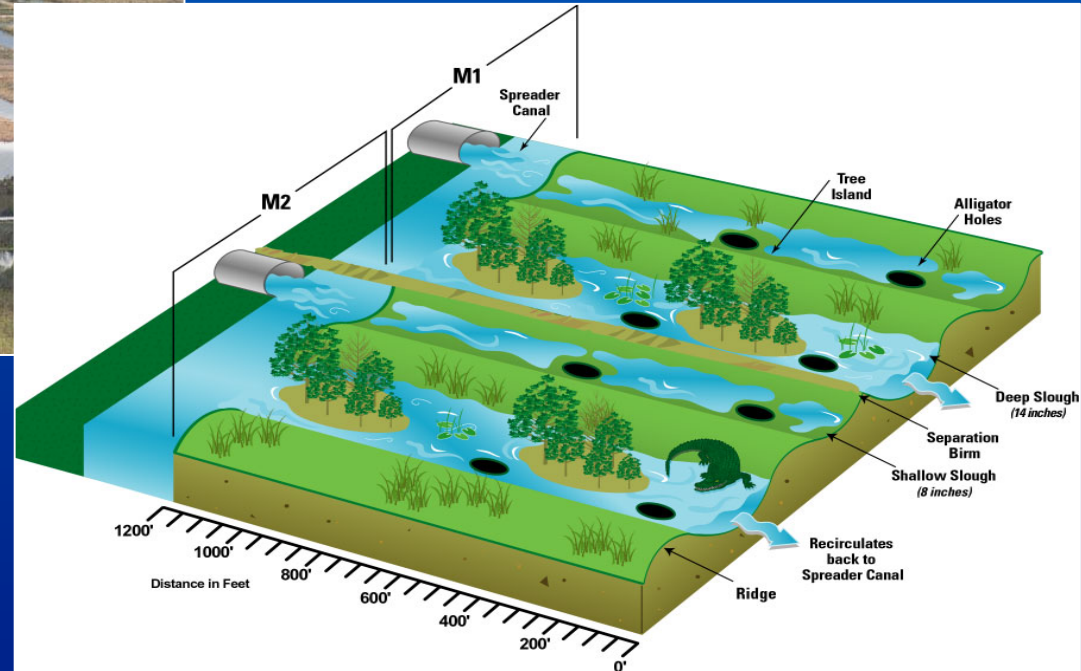


# Restoration Coordination and Verification (RECOVER)



- Purpose - Organize and apply scientific and technical information to support the system-wide objectives of CERP
- Interagency, interdisciplinary team of scientists, engineers, planners, and resource specialists
- Systematic process to address uncertainties associated with ecological responses
  - Adaptive management
  - System-wide monitoring program
  - Determine needed changes in the Plan

# Loxahatchee Impoundment Landscape Assessment (LILA)





# Objective of LILA:

Define hydrologic regimes that sustain a healthy  
Everglades ecosystem for:



**Wading Birds**



**Sloughs**



**Tree Islands**



**Questions?**